

## Unit 1 - Systems of Linear Equations

Consider:

A linear relation can be represented graphically as a straight line.

A straight line is made up of an infinite number of points,  $(x, y)$ , connected together.

Some other straight line would be made up of an infinite number of different points.

What does it mean for these lines to intersect?

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## Unit 1 - Systems of Linear Equations

### Solving Linear Systems Graphically

The solution to a linear system is the point  $(x, y)$  where the lines intersect

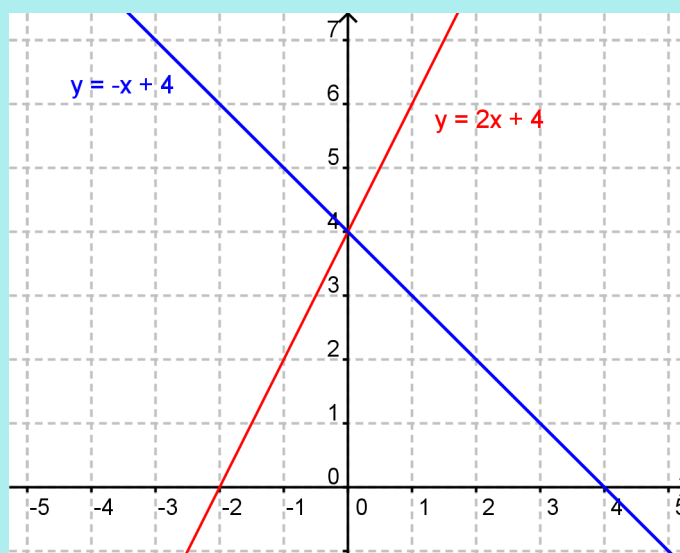
Each of the following pairs of equations forms a linear system.

Consider their graphs to determine the number of solutions:

a)  $y = 2x + 4$    b)  $y = 2x + 4$    c)  $y = x - 3$    d)  $y = 2x + 4$   
 $y = -x + 4$     $y = 2 - x$     $4x - 4y = 12$     $y = 2x$

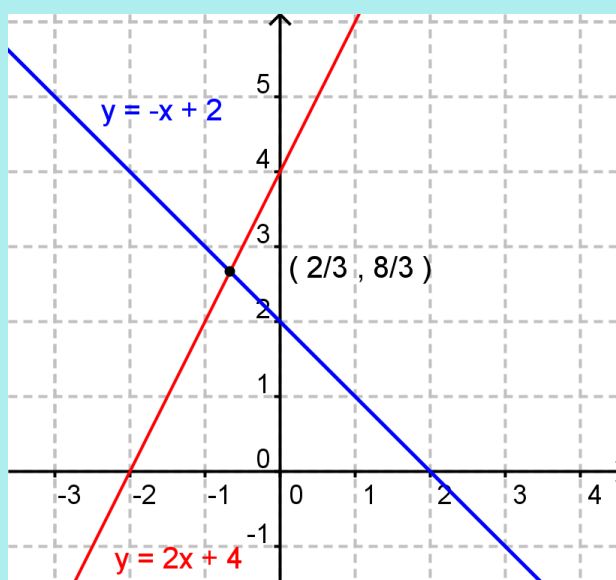
solve graphically

a)  $y = 2x + 4$   
 $y = -x + 4$



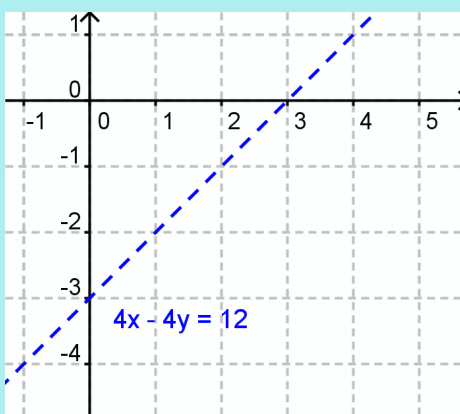
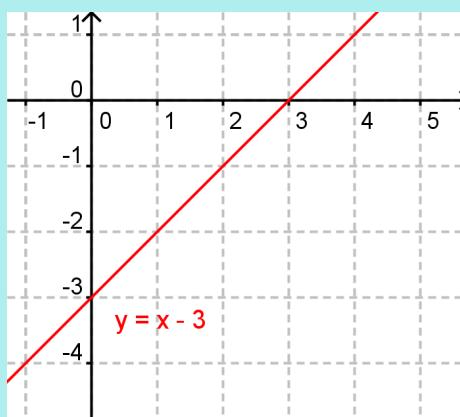
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b)  $y = 2x + 4$   
 $y = 2 - x$



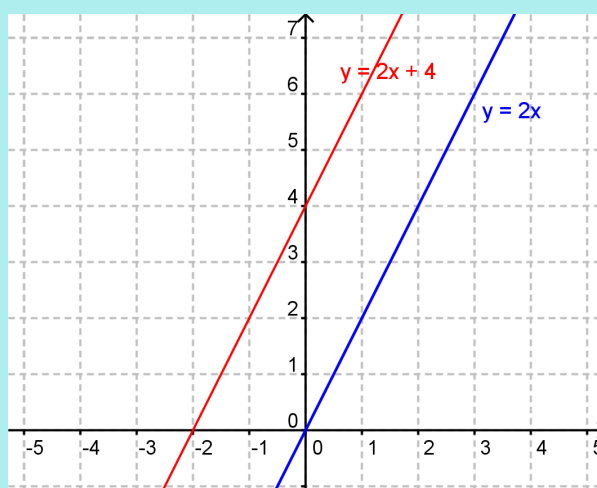
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c)  $y = x - 3$   
 $4x - 4y = 12$



#3, #4

d)  $y = 2x + 4$   
 $y = 2x$



#1, #2

In Summary:

For no solution:

- same slope and different y-intercepts

For exactly one solution:

- different slopes only
- some graphical systems can only be solved exactly using technology

For infinitely many solutions:

- same slope and same y intercept

summary

To verify or check a solution,  $(x, y)$ , substitute the values for  $x$  and  $y$  into the LS and RS of each equation.

If  $LS = RS$  for each equation, the solution  $(x, y)$  is valid, or correct.

Ex.1 Given  $y = 2x + 5$ , write a second equation such that the system has:

- i) no solution
- ii) exactly one solution
- iii) infinitely many solutions.

ex3

Ex.2 Verify that  $(-1, 2)$  is a solution to the system

$$y = 3x + 5$$

$$x + y = 1$$

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Ex.3 What value of  $a$  gives a system with no solution?

$$x(a-1) - y + 6 = 0$$

$$2x + y - 3 = 0$$

ex2

Assigned Work:

p. 26 # 1ab, 2, 3ab, 5abf, 10, 18\*

hw

Attachments

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Basic 2D Grid.agg